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*Stieler's Hand-Atlas.* Gotha, Justus Perthes. f°.

It is now six years since the last edition of this great work has been issued. Since that time the commercial development of certain regions, and the additions to our knowledge of others, have been so great, that the atlas did not meet the demands of the day: therefore the new edition, the first instalment of which has just been issued, is highly welcome. It is hardly necessary for us to dwell upon the fact that the technical execution of the maps is artistic and accurate. In the last edition of the atlas a few of the older plates, which were somewhat worn, and not as perfect as the newer ones, were retained; but these are now altogether eliminated. We consider it a great improvement of the maps, that the shading all along the coast which is intended to show the water has been discarded, and that a delicate blue tint has been introduced instead. The first instalment contains two new maps, — one sheet of the new four-sheet map of Italy, and one of the four-sheet map of Austria. The relief of Italy is presented here for the first time in an atlas in a clear form, and, what is more, representing the real configuration of the land instead of the old conventional forms. It is founded upon the surveys of the Italian Department of War, which are rapidly being pushed forward. In order not to disturb the impressiveness of the physical features, the railroads are shown as formerly projected roads were generally shown.

The first sheet of the map of South America may serve as an example of the care with which corrections have been made on the old plates. The sheet embraces north-eastern Brazil and French and Dutch Guiana. The interior of the Province of Pernambuco is entirely new, the northern tributaries of the San Francisco being for the first time shown in their real form. While the old maps showed a series of hills running from north to south, we observe now a well-defined ridge forming the watershed between the provinces of Pernambuco and Ceara. In other places, rivers which were shown in solid lines on the old maps, are shown in broken lines on the new ones, indicating that our knowledge is not so complete as was formerly assumed. We observe this particularly in the province of Grao Pará; and farther up the Amazon we see, to our surprise, the course of the Rio Trombetas entirely changed, although it was thought that its course was well known. The administrative boundaries of the provinces of Brazil have also undergone important changes.

The atlas, when complete, will contain ninety-five sheets; the map of the moon, and a few general maps of the old edition, being left out in order to gain room for new detail maps. The following maps have been added to the atlas: two sheets showing the eastern portion of Austria, a four-sheet map of Italy, a general map of the Balkan Peninsula and four special maps of the same, a map of Africa in six sheets, and western Canada. Besides this, the maps of Germany, Austria, Denmark, and Asia Minor have been replaced by new engravings.

*A Synopsis of Elementary Results in Pure Mathematics.* By G. S. CARR. London, Francis Hodgson. 8°.

THIS volume of more than nine hundred royal octavo pages is a handbook which must be extremely useful to every one engaged in either teaching or applying mathematics. As its title implies, it is principally a collection of results, more especially of theorems and formulæ. For example, the section devoted to the integral calculus, which comprises more than one hundred pages, contains a complete synopsis of all the ordinary integrals, both definite and indefinite, with brief indications of the method of deriving them. The statements are models of condensation, being at once clear and concise. Especial attention seems to have been devoted to the typographical arrangement, which is extremely clear; the words, numbers, and formulæ which are first to catch the eye, and are principally to be used, being printed in large, bold type, while the indications to be subsequently examined are in finer type.

Notwithstanding the general excellence of the book, it seems susceptible of many improvements, both in its plan and in its details. It cannot displace the text-book, nor is it intended that it should: hence it would have been well to omit all matter for which the student would naturally go to his text-book, as well as that for which no book is needed. This is especially the case with the chapter on elementary geometry, and with large portions of the

chapters on trigonometry, which might have been omitted or greatly condensed without diminishing the usefulness of the work. Notwithstanding that the brief demonstrations are concise in the extreme, many more are given than have any appropriateness in the book. In most cases it is only the result, and not the proof, which the person using the book will want, and when he does want the latter he will generally know where to find it. More space might, then, have been devoted to advanced subjects, which are not sufficiently developed.

In detail the defects are very numerous, considering the amount of labor and care which seems to have been devoted to the work. The astronomical and physical constants at the beginning of the book are so far from embodying the latest results as to be worse than useless to any one wanting precise values of constants. In the factor-tables it seems almost ridiculous to see a mathematician give *zero* as the smallest factor of a prime number. It should have been unity, if given at all; but Burckhardt's plan of indicating prime numbers by a dash is much more convenient. Among the subjects insufficiently treated are regular solids (no mention is made of sym-polar relations), trigonometric series, and determinants. What is given of the calculus of variations might as well have been omitted entirely.

The term 'eliminant' being almost entirely replaced by 'resultant' in mathematical language, the former should not have been used to the exclusion of the latter. In Section 1628 an invariant is described as multiplied by the modulus of transformation, when in fact the co-efficient may be any power of that modulus. In Section 1637, Cor. 2, it is stated, that, if any quadric is resolvable into two factors, the discriminant vanishes. But this is not true of the binary quadric, which is the most common one.

We should naturally suppose that great care had been taken in the printing: it is therefore surprising to see in equation (4) of Gauss's trigonometric formulæ, p. 190, ' $\cos \frac{1}{2} c$ ,' printed in bold type, instead of ' $\sin \frac{1}{2} c$ .'

These defects are not to be considered as materially detracting from the value of a most excellent piece of work, which should be welcomed by all teachers of mathematics.

S. N.

#### NOTES AND NEWS.

ONE method of disposing of the surplus water of the Mississippi River that has been proposed has been to construct an outlet for the flood-water through Lake Boyne. Capt. S. S. Leach, Corps of Engineers, formerly secretary of the Mississippi Commission, explained to the Senate Committee on the Improvement of the Mississippi River, last Saturday, why this plan is not feasible; in fact, he characterized it as preposterous. He said that such an outlet would increase the velocity of the river at New Orleans by at least twenty-five per cent. Already it requires the best engineering skill to prevent the banks at that point from being washed into the river. If the velocity of the flow should be increased twenty-five per cent, he said, no expenditure of money would make them retain their place. Captain Leach also explained the plan upon which the Mississippi River Commission is now working. He estimated that a system of levees from the mouth of the river to the head of navigation, protecting all points that need additional protection, will cost three million dollars, and that thirty millions would be needed to establish a ten-foot channel through the same length of the river.

— The Hydrographic Office has received a number of reports of peculiar colorings of the sea, of which the following are the most interesting. The captain of the British steamer 'Kathleen' reports, that April 23, latitude  $36^{\circ} 25'$  north, longitude  $48^{\circ} 10'$  west, he passed through about five miles of discolored water. It had the appearance of sulphur floating on the surface. The captain of the American bark 'John J. Marsh' says, that April 27, in latitude  $35^{\circ} 34'$  north, longitude  $74^{\circ} 50'$  west, his ship passed through a patch of water as white as milk, the edge of which was distinctly marked, and which was not phosphorescent. The extent of it was about three miles in longitude and five miles in latitude. He found no bottom by sounding at thirty-five fathoms. The sky was clear, and the stars shone brightly, at the time. The officers of the British steamer 'Lero' report, that April 25, in latitude  $35^{\circ} 04'$  north, longitude  $58^{\circ} 16'$  west, their ship passed through a wide-